

Flight, February 19, 1910.

# FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

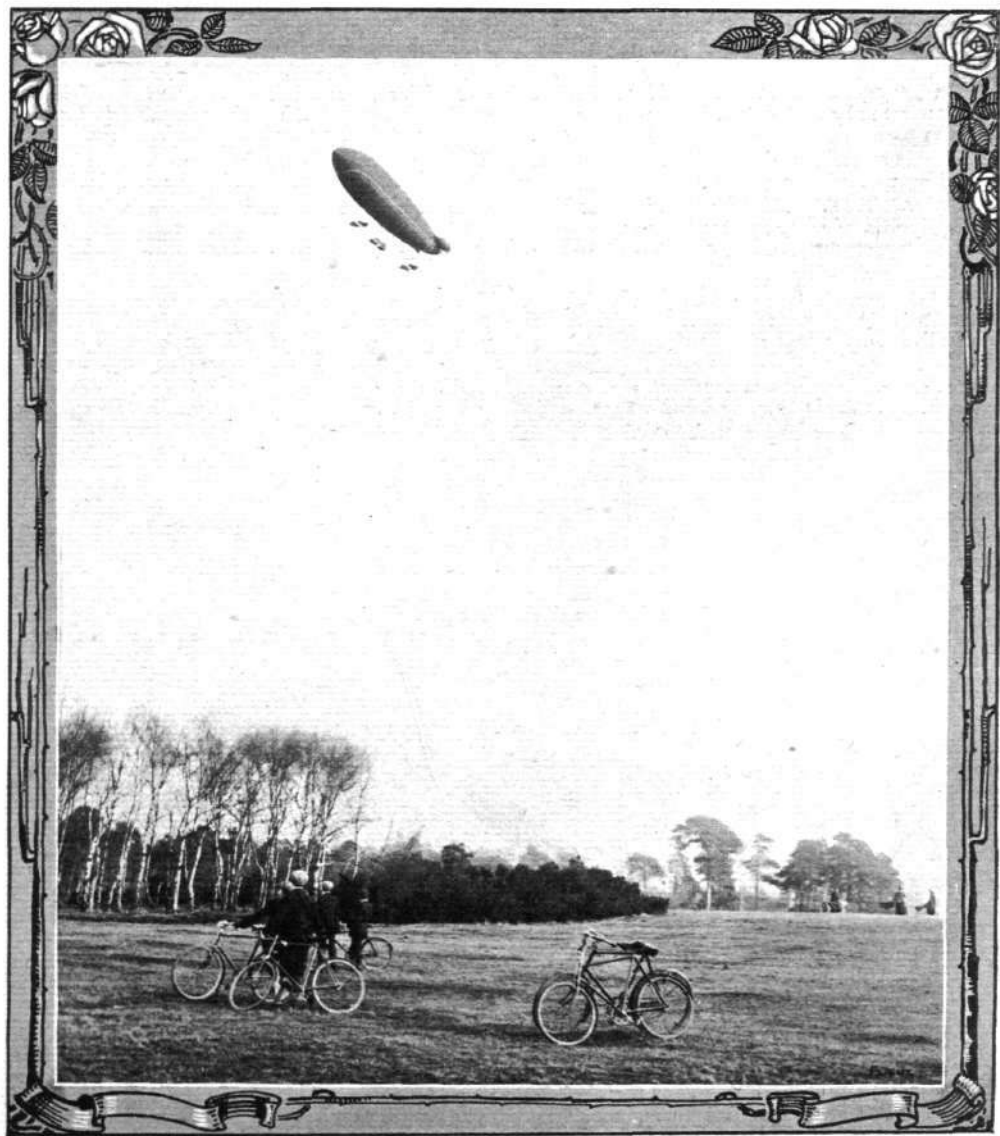
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 60. (No. 8, Vol. II.)

FEBRUARY 19, 1910.

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New Army Airship in flight last Saturday over Farnborough, when the new military dirigible made its first appearance.

## **"ROYAL" PROGRESS IN BRITAIN.**

ALTHOUGH during the past couple of years the charge that Great Britain was lagging behind in the race for the supremacy of the air has had all too much foundation in fact, the position is, we are glad to think, so far improving, that we can now begin to look forward into the future with some complacency. We do not say that anything like all has been done that might have been, or that we are yet well on the way towards taking the place in aviation that in years past we should have considered ours by prescriptive right in the development of mechanical science. Possibly we have less imagination than we had in past generations, and perhaps our forte has become that of development rather than invention. But be that as it may, although, perhaps, as a nation we have not done all that we would have liked to have done in the discovery of first principles, we are endeavouring to atone now for our lapses, and are making up a good deal of the lost ground.

Much good, and to a great extent unobtrusive work is being done in many quarters, as is being evidenced in the pages of *FLIGHT* week by week of late. Our past few consecutive issues have contained numerous descriptions of all-British aeroplanes and all-British dirigibles, while almost every day brings us fresh news of development in one detail or another. There can be no question but that British enterprise has begun to go ahead in an eminently satisfactory manner, albeit this country still has a long way to go before it can actually claim to have regained its rightful place among the nations. For some of our backwardness we may lay the blame at the door of those too conservative authorities who, ostrich-like, have declined to believe until the knowledge was forced upon them that the science of flight was one worthy of serious encouragement. In this, as in many other directions, it has been left to the private inventor and experimenter to do all the spade-work, without help, or even sympathy, from the State, while foreign Governments were encouraging the newly-fledged science financially, and in every other way that far-sighted patriotism could suggest. Even now, the British aviator probably receives less encouragement from the State than any of his foreign rivals. It would seem indeed that in the eyes of the permanent officials of the Government the inventor is a person who is a serious nuisance, to be ignored at any cost.

But even if there is not much help to be got from those to whom one naturally looks for it for the advancement of a science like aviation, which has so tremendous a bearing upon the question of national defence, splendid headway is assured now that His Majesty the King has come forward to the rescue. Not only has he graciously given his patronage to the near approaching Aero Show at Olympia, but just as we go to press we learn officially that King Edward has granted permission to the Aero Club of the U.K. to use the prefix "Royal." The mere fact that the head of the State is so alive to the possibilities of the movement must in itself produce a marked all-round effect. It must of necessity have a beneficial influence upon the industry itself, because even the most sceptical of people must realise that there is a great immediate future for aviation if the King himself agrees to associate his name with the second Aero Show held in Great Britain. As is known by every student of flight who has graduated through automobilism—and most have—it was many years before those same honours were accorded to automobilism

in this country, and on this fact we may justifiably congratulate ourselves, particularly in view of the far-reaching influence which His Majesty's patronage is bound to exert upon aeronautic progress at home.

The mention of automobilism in connection with aviation leads us once more to the consideration of how vastly the latter has benefited by the heavy spade-work that has been done in the past by the Royal Automobile Club, and by the automobile movement generally, this having undoubtedly assisted enormously in obtaining thus early a dignified recognition for the new industry, which is at once a sport as well. In many ways aviation has benefited from this spade-work of which we speak. In the face of much opposition and many discouragements, the R.A.C. persevered with the task of lifting automobilism from the status of a movement that was as an Ishmaelite in the land to that of universal recognition as one of the most powerful factors in the development of civilised life, and as having the support and approval of every section of the community, from the King himself to the humblest of his subjects, who avails himself of the motor 'bus to take him to and from his daily toil. How well the Club has succeeded in this work it is unnecessary for us to elaborate at the moment—its record stands so that he who runs may read. The official and the public mind have been educated in such a way that all the later developments in automobilism, which if they had come suddenly without this preparatory education would have aroused fresh opposition and fresh prejudice, are now apt to be looked upon as almost commonplace, and to be greeted simply as the natural and progressive outcome of an industry that is firmly established. Aviation itself, as a development of automobilism in its widest sense, may not yet be looked upon by the man in the street as commonplace, but it is already being treated by the generality of people with a recognition of its possibilities almost amounting to familiarity. For this we are more indebted to the automobile movement and its representative bodies than most of us are in the habit of recognising.

Taken altogether, the prospects of aviation in Great Britain may be viewed with a good deal of confidence and hope for the future, both in the hands of the State itself and of those private individuals who are spending time, money, and thought in the pioneer work which is doing for this new industry and sport what similar work in another direction has done for the motor industry. The history of motoring in this country is an exemplification of what we may quite justifiably anticipate in the case of flight—except that we do not start with repressive legislation already on the Statute Book. Other countries, more imaginative, or with the inventive faculty better developed, obtained a substantial lead over ourselves, but although tardy in getting seriously to work, and hampered to some extent by conservatism and an unwillingness to plagiarise, it is well to recognise that the lost ground is rapidly being made up, and that there is no reason why the British flight industry should not speedily attain to at least as strong a position as that of any other country. There was at one time far more leeway to pick up in the automobile industry as compared with France, Germany, and even Italy than there is to-day in connection with aeronautics; and yet it took but a very few years to neutralise that lead in spite of all adverse influences at home.

## THE ROYAL AERO CLUB OF THE U.K.

As we go to press we have received from the Secretaries of the Aero Club the following copy of the official communication (addressed to Mr. Frank Hedges Butler), conveying the order of H.M. the King, that the Aero Club be henceforth known as the Royal Aero Club of the United Kingdom:—

SECRETARY OF STATE,  
HOME DEPARTMENT,  
WHITEHALL,

February 15th, 1910.

SIR,—I am directed by the Secretary of State to inform you that he has had the honour to lay before the King your application of the 10th November last, on behalf of the Aero Club of the United Kingdom, for permission to use the prefix "Royal" in the name of the Club, and that His Majesty has graciously signified his pleasure that the privilege sought for be granted, and that the Club be henceforth known as the Royal Aero Club of the United Kingdom.

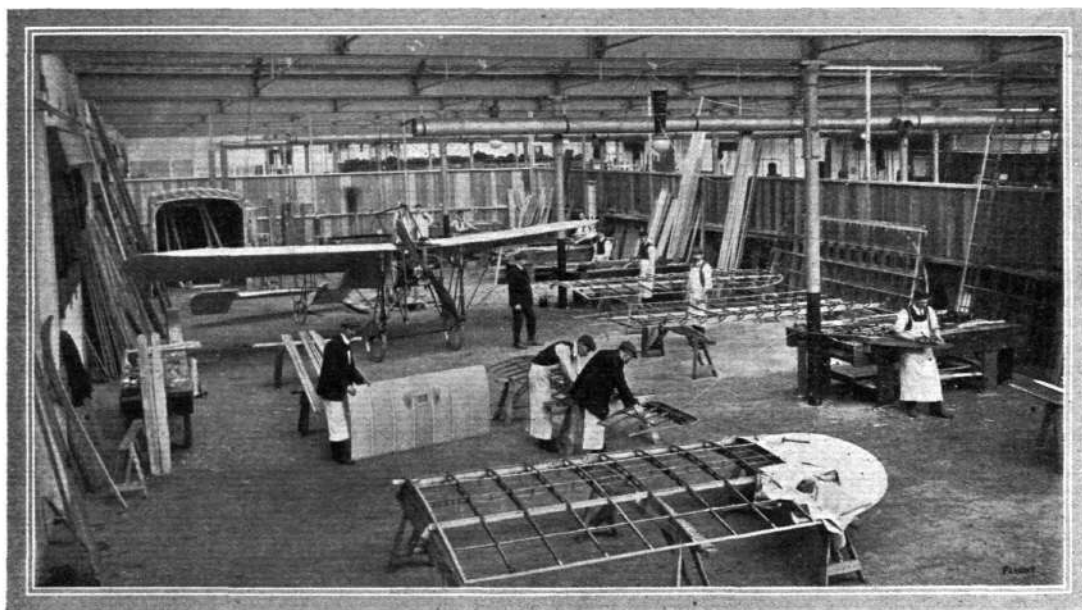
I am, Sir,  
Your Obedient Servant,  
HENRY CUNYNGHAME.

(Signed)

## HUMBER AEROPLANES.

AS readers of FLIGHT are already aware, considerable progress has been made by the Humber Company in the development of the new aeronautic department of their huge factory at Coventry. Their intention is to build biplanes as well as monoplanes, and indeed their present catalogue includes full particulars concerning both these first standard models; but chiefly the shops are now busily engaged in the output of the latter, and of special

Other shops at the time of our visit were in full swing building large numbers of the wooden propellers, while we found quite a considerable amount of interest centreing around the triple-cylinder Humber engines that have been specially designed for the work of propulsion. These 3-cylinder engines are of the radial type, with a bore and stroke of 180 mm. and 135 mm. respectively, their normal output being 30-h.p., with a total weight of



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engines for aeroplane propulsion, as may be gathered from the accompanying photograph taken by us last week in one of the erecting shops.

A good idea can be obtained from this illustration of the very thorough manner in which the work of manufacture is being conducted by the Company, particularly when it is realised that this is but one of the numerous shops engaged in aeroplane construction, and that every part is built upon the premises. Therein may be observed a monoplane complete except for its finishing touches, while the various men are busy with main planes, elevators and propellers for similar machines.

155 lbs., including magneto. The Company also build a 4-cylinder model of 50-h.p., the total weight of which is 190 lbs.; and this engine, the bore and stroke of which are 110 mm. and 120 mm., has copper water-jackets to each individual cylinder.

Apart from these flyers and engines, a special Humber radiator has been produced; but this is only one of the many other details to which we hope to refer at considerably greater length within the next few weeks. For the moment it must suffice to draw attention to the remarkable progress that has been made within a comparatively short time.



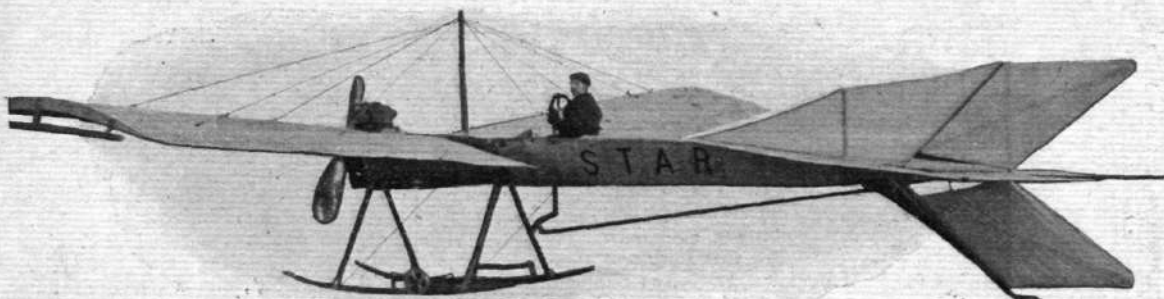
## THE STAR MONOPLANE.

YET another British aeroplane is illustrated by the accompanying photograph, the machine in question being a monoplane built by the Star Engineering Co. at their Wolverhampton Works.

This monoplane has a span of 38 ft. and an overall length of 30 ft. The framework is built of ash braced with steel wires, while the body is divisible into two parts for convenience in transport, the division point of the frame occurring just behind the pilot's seat. The wings are double surfaced and are set at a dihedral angle; they are braced to a central mast by radiating wires. The tail consists of a horizontal plane and a vertical plane;

with larger pneumatic-shod wheels, the metal wheels being too liable to sink into the ground in its present heavy state in consequence of the recent bad weather.

As will be seen from the photograph, the engine is situated right in front and drives a two-bladed tractor-screw that exerts a pull of 180 lbs. at 1,200 r.p.m. The blades of the screw are made of aluminium, stiffened by a strip of steel riveted along the back, while the entire surface is highly polished. Arranged alongside the body somewhat on the lines of the "Antoinette," the radiator consists of a large number of thin brass tubes, and the circulation of the cooling water is effected by a pump,



The "Star" Monoplane.

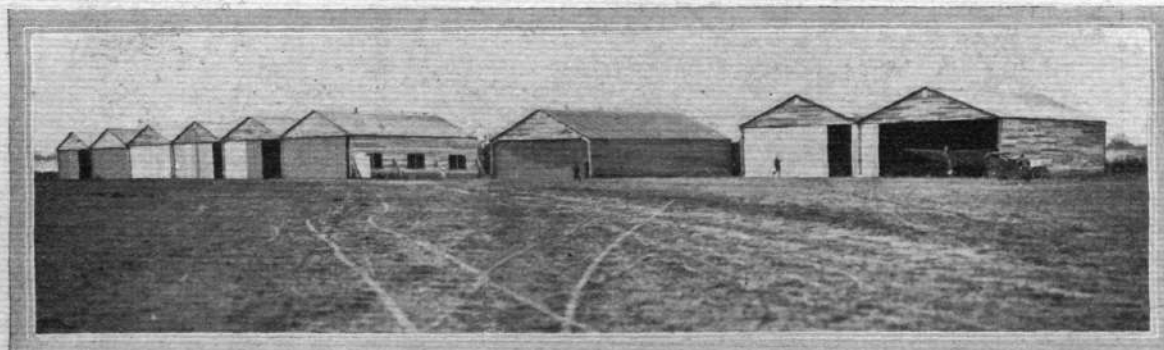
and both these members are extended by hinged planes, thus forming a rudder and elevator, of which the exact details of control are the subject of patents taken out by the manufacturers. All movements of the machine are controlled by the steering wheel, which operates both sets of steering planes.

Beneath the machine in front is a light wood chassis, having a pair of skids that also carry a pair of aluminium wheels for use when running along the ground. These wheels are suspended by light leaf springs that allow them to rise sufficiently far for the runners to take the entire weight of the machine in the event of sudden shocks, and the tail end of the machine is protected by a light skid. After preliminary trials in Dunstall Park it was found advisable to replace the aluminium wheels

Without the pilot, the total weight of the machine is 876 lbs., and it is expected that a speed of 30 miles per hour will be necessary for ascent. It is fitted with an exact replica of the 15-h.p. Star engine that made such good running on the Brooklands Track recently, and from which as much as 30-h.p. has been obtained.

This engine is only fitted temporarily pending the completion of a special 50-h.p. motor that is being constructed at the Star works, and is expected to weigh about 100 lbs. less than the motor now being used.

Up to the present no attempts at actual flight have been made, the pilot merely running the machine round the track, minus the wings, so that he might become thoroughly familiar with the working of the controlling gear.



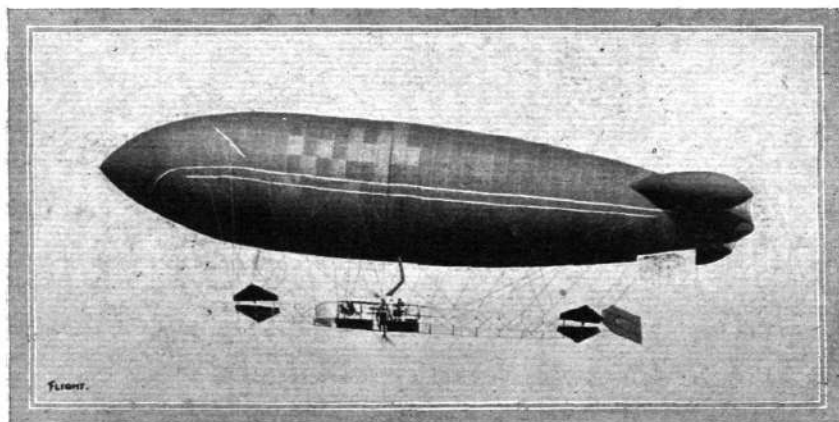
**FLIGHT AT BROOKLANDS.**—Steady work is progressing at the Weybridge aerodrome, although not much fuss is being made. At a recent visit among the machines in the aeroplane sheds were the Lane monoplane; Mr. C. A. Moreing's Voisin biplane; Mr. H. G. D. Astley's monoplane; Mr. Holt's flyer; Mr. Neal's monoplane; Mr. Claude Grahame-White's Blériot monoplane.

## THE NEW ARMY DIRIGIBLE.

WHEN referring in our issue of January 15th to the developments at the Army Balloon Factory, we hinted that the big shed there housed something more than the little experimental "Baby" airship, and the truth of this was revealed on Saturday, when the few people whose business took them to Farnborough Common were surprised to see the doors of the big shed roll back, and a new airship issue forth. In shape, the envelope is somewhat reminiscent, as will be seen from our photographs,

pellers to assist in elevating the airship or *vice versa*. This, of course, is an entirely new idea in a dirigible, although M. Blériot has a patent covering the application of a similar arrangement to aeroplanes. Except for the envelope, which was built of German material in France, the new dirigible is entirely British built. It will be seen from our photographs that two sets of triangular elevating planes are fitted, one at each end of the car, and that steering is effected by a large rudder, while a stabilising plane is fixed beneath the after end of the envelope.

The airship was towed out of its shed on Saturday by a squad of engineers, and was promptly dubbed "Yellow Peril," on account of the bright colour of the envelope, but the official designation of this latest addition to the Army equipment is "Dirigible No. IIa." As soon as everything was ready, Col. J. E. Capper and Lieut. Waterlow took their places on the forward platform, while Mr. McQuade and Mr. Green stepped into the "engineer's cabin." After giving the engine a preliminary run to see that all was in order, the word was



The new Army Airship, as seen from below, showing the shape of the planes and rudder.

of the craft built at the Astra works in France, except that there are only two external ballonettes or flukes placed one on each side. It is 154 ft. over all, while the capacity is 70,600 cubic ft. The car, 84 ft. in length, is also similar in design to those used on the "Astra" airships, and is a structure of steel and hickory. The motor is an 80-100-h.p. Green, placed transversely, and driving two pairs of double-bladed propellers, of 8 ft. 10 in. in diam., one set on each side of the car, with the axis of the propeller-shaft so arranged that it can be adjusted to any inclination to enable the pro-

given to cast off, and the airship rose to a height of about 500 feet. She manoeuvred at this elevation for some time, and then, on some ballast being discarded, rose to 1,500 to 2,000 feet, and then carried out numerous evolutions over Laffan's Plain. Eventually, after being aloft about 50 mins., the descent was safely made on the Common, just by the balloon factory. Throughout its trials the new vessel behaved satisfactorily, as far as could be judged "from the land," and, of course, no details as to the results have been officially published.

## STRINGFELLOW'S MODEL TO BE RECONSTRUCTED.

WE learn from Mr. C. H. M. A. Alderson that the historic relics of the famous Stringfellow model are about to be used for the purpose of reconstructing a replica of the original machine for exhibition in the South Kensington Museum. Such an eminently suitable way of preserving the remnants of what there is every reason to suppose was the first model to actually fly under its own power, does credit to the authorities who have the matter in hand, and is, moreover, a fitting appreciation of the parts played by Mr. Patrick Y. Alexander and the Aeronautical Society of Great Britain, through whose generosity and influence these links with the past are now preserved to the nation.

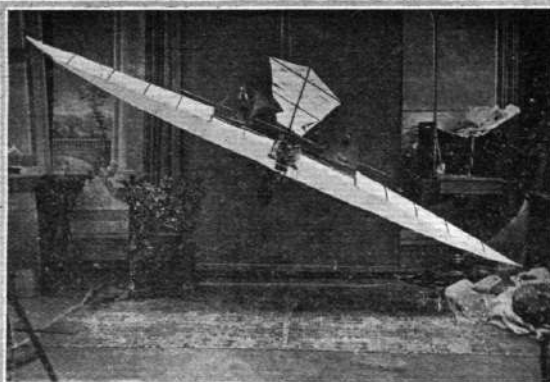
Some idea of what the Stringfellow model was like may be judged from one of the accompanying photographs, for which we are also indebted to Mr. Alderson. The machine was a monoplane, and was built by J. Stringfellow, of Chard, Somersetshire, in the year 1848. The wings had a span of about 10 ft. and a maximum chord of 2 ft., so that the aspect ratio was at least 5. According to the accompanying photograph the wings in plan form

appear to be elliptical, with pointed extremities. The tail measured about 1 ft. 10 in. span by 3 ft. 6 in. chord, and had an area of about 5 sq. ft.

A small steam engine, which has recently been discovered and presented to the Museum by Sir John Heathcoat Amory, was used to drive two 16-inch diameter 4-bladed propellers, and constituted the motive power of the machine.

In addition to this model Stringfellow also constructed a triplane, and was probably the first to make use of superposed surfaces. This model was exhibited at the first aerial exhibition held by the Aeronautical Society at the Crystal Palace in the year 1868, and is therefore not only a very interesting memento of aviation in the last century, but is also a very striking illustration of the long record that stands to the credit of the oldest institution associated with flight—the Aeronautical Society of Great Britain.

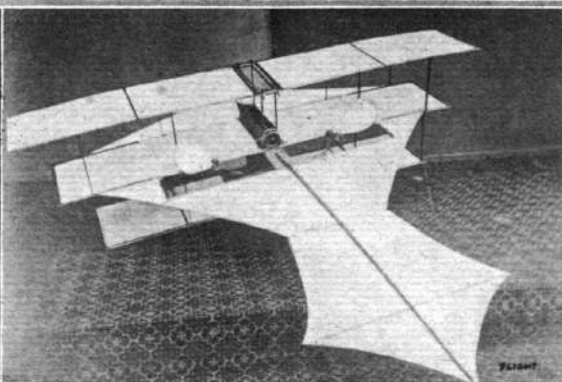
Collaborating with Stringfellow at an earlier date Henson built a model with a 20 ft. span and a chord of 3 ft. 6 ins. that had a weight of from 28 to 30 lbs. and



The Stringfellow model monoplane of 1848.

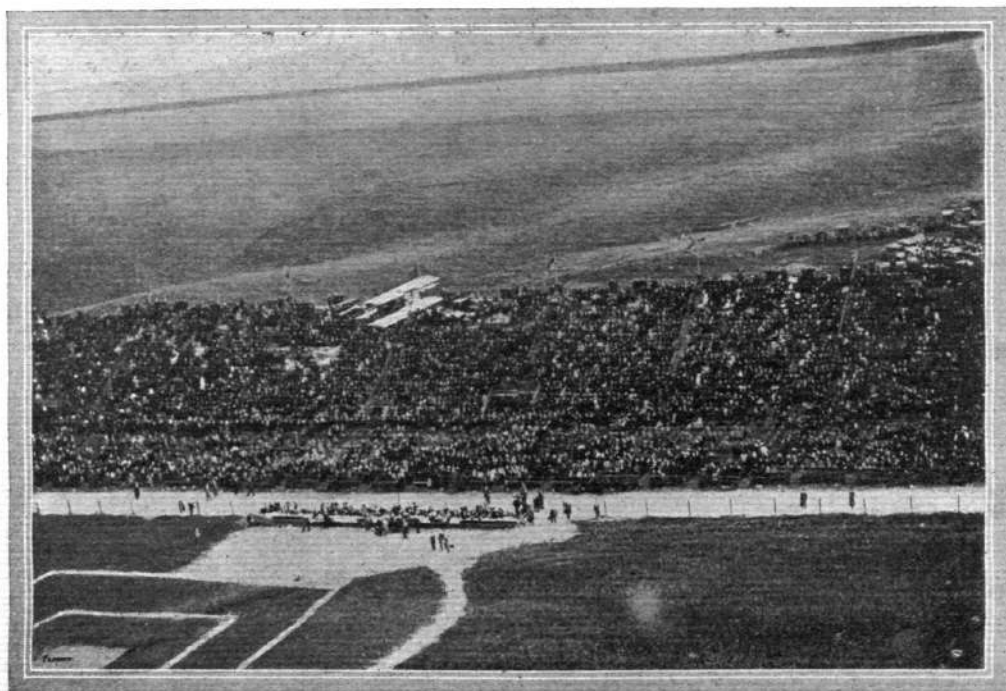
an area of 70 sq. ft. This model represented the embodiment of ideas that Henson put forward in 1842, when he proposed to design a full size machine with 4,500 sq. ft. supporting surface obtained from a span of 150 ft. and a chord of 30 ft. Experiments with the model were conducted on Bala Down, in Somersetshire, but before any definite results were obtained Henson left England. Stringfellow continuing the interrupted experiments alone, ultimately achieved success with his own model a few years later.

Apart from the interest directly attaching to the Henson and Stringfellow models as flying machines in embryo, they have a very considerable importance on account of their indirect association with the famous



The Stringfellow model triplane of 1868.

English scientist, Sir George Cayley. Cayley's articles on flight in "Nicholson's Journal" and the "Philosophical Magazine" undoubtedly influenced Henson and Stringfellow in their work. Cayley was a profound and, as events have proved, an extraordinarily accurate thinker, for his investigations led him to suggest most of the essential characteristics of the modern aeroplane, although the date of his work was 1809. By a happy coincidence the Aero Show last year formed a commemoration of his centenary. Many of our readers will doubtless remember an article that we devoted to the subject in FLIGHT, Vol. I, page 240, where a photograph also appeared showing a copy of the early Henson model that the Aero Club had prepared for exhibition purposes.



LOS ANGELES FLIGHT MEETING.—Remarkable photograph of Curtiss in flight, on his biplane, over the Grand Stands, taken from a captive balloon.



## AERIAL PROPELLERS.

BY A NAVAL CONSTRUCTOR.

(Continued from page 107.)

## CHAPTER VI.—Method of Obtaining the Best Propeller for given Conditions.

IN order to design a propeller we require:—

1. Diameter of the propeller, D.
2. Pitch ratio of the propeller, P.
3. Disc area ratio.

As before stated, the thrust of a propeller of diameter D advancing with a velocity V is given by T, where

$$T = \frac{\kappa}{1000} V^2 D^2, \kappa \text{ being a constant obtained by a model experiment.}$$

The value of the constant  $\kappa$  has been worked out for four types of propeller of pitch ratio '6, '8, 1'0 and 1'2.

We should work between these limits. The method of using these curves is as follows:—

Suppose we know that our aeroplane travels at a speed of 60 ft. per second (about 41 miles per hour) and

We shall work out fully the results for a single and twin screw, and for each of these cases we have taken propellers of 6 ft. and 8 ft. diameter, each being of 2, 3 and 4 blades.

The following is a specimen of the method of calculating the results in the following tables.

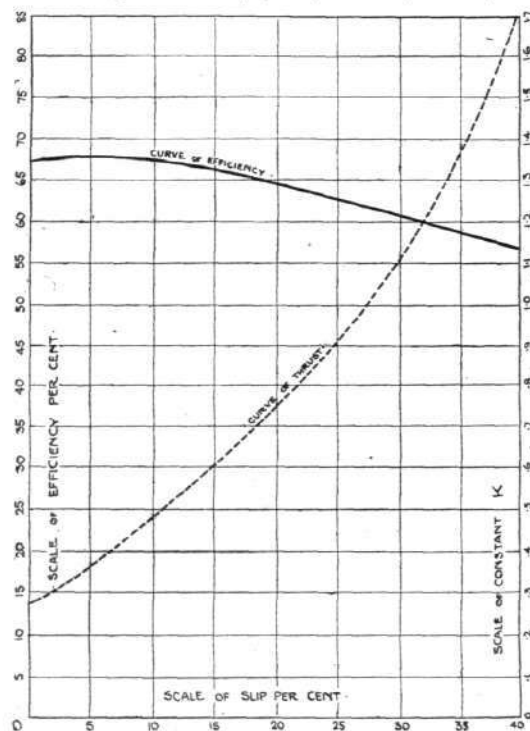
Suppose we have a single screw, with two blades, and 6 ft. diameter.

In the case taken Thrust = 150 lbs., Diameter = 6 ft., Velocity forward = 60 ft. per sec.

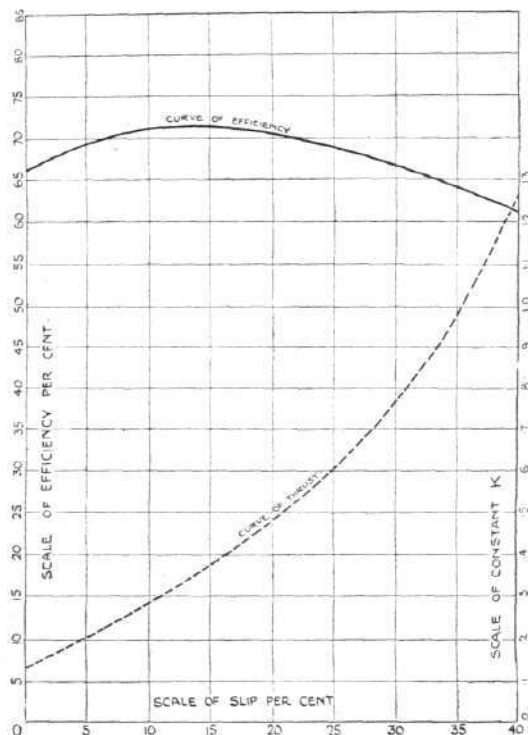
$$\text{Now from formula } T = \frac{\kappa}{1,000} V^2 D^2,$$

$$\text{hence } \kappa = \frac{1,000 \times 150 \text{ lbs.}}{(60)^2 \times 6^2} = 1'16.$$

That is, all two-bladed propellers of 6 ft. diameter travelling forward at 60 ft. per sec. should have a value of  $\kappa = 1'16$ .



No. (a).—Blade pitch ratio '6.



No. (b).—Blade pitch ratio '8.

requires a thrust of 150 lbs. to drive it. This example has been worked out fully below.

All this work would not be necessary in an actual design, but the effect of a change in the different variables is very clearly shown in the tables.

The results deserve the most careful study, and every point should be clearly understood.

1. **The Diameter.**—This is purely arbitrary. Sometimes, however, it is limited by the shape of the aeroplane in the vicinity. With our present-day practice the diameter should not exceed 10 ft.

We now turn to the curves.

From these we see, in the '6 pitch ratio curve, for a value of  $\kappa = 1'16$  we have corresponding a slip of 30 per cent. and an efficiency of 60 per cent. We repeat this for the '8, 1'0 and 1'2 pitch ratio curves, and tabulate as shown.

For a three-bladed propeller the value of  $\kappa$  would be  $\frac{1'16}{1'33}$ , and for a four-bladed propeller  $\kappa$  should be  $\frac{1'16}{1'55}$ .

We have made tables for the three-bladed and four-bladed propellers below.

To get the revolutions and horse-power, having given the diameter, pitch ratio, slip, and efficiency, we proceed as follows:—

1. **Revolutions.**—The actual velocity forward when the revolutions, diameter, pitch ratio and slip are given, is given by  $V = \text{Revs.} \times P \times D \times (1 - s)$ .

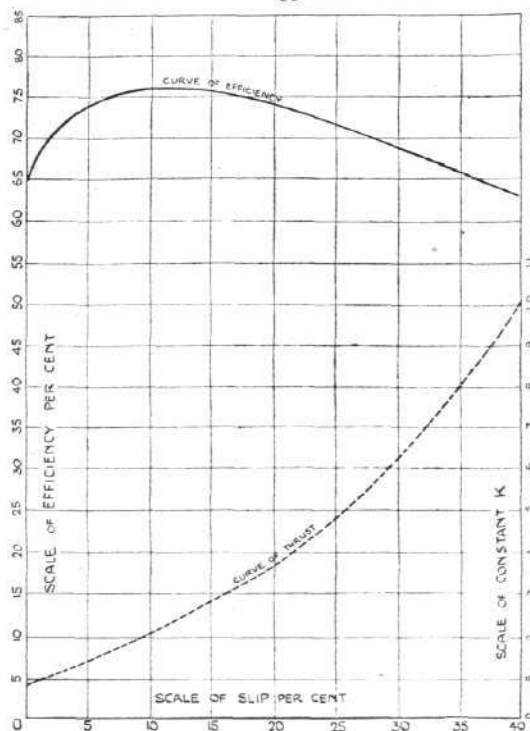
Now for the 6-ft. two-bladed propeller of pitch ratio '6 as above.

$$V = 60 \text{ ft. per sec.}, P = '6, D = 6 \text{ ft. } s = '30;$$

$$\text{hence revs.} = \frac{60}{6 \times 6 \times (1 - '30)} = 24'2 \text{ per sec.} = 1,450 \text{ per minute.}$$

2. **Horse-Power.**—In terms of the above quantities this is given by  $\text{B.H.P.} = \frac{\text{Thrust} \times \text{Veloc.}}{4500 \times \text{Efficiency}}$

$$\text{In our case this would be } \frac{150 \times 60}{550 \times '60} = 27'3 \text{ B.H.P.}$$



No. (c).—Blade pitch ratio '1.0.

That is, an engine running at 1,450 revs. per min., and developing 27'3 brake horse-power, will give the 150 lbs. thrust necessary to drive the aeroplane at 60 ft. per second, if the diameter of the screw is 6 ft. and pitch ratio '6, that is pitch = 3'6 ft.

The following are the tabulated results:—

Diameter of propeller, 6 ft. Thrust developed 150 lbs.

For two-bladed propeller  $\kappa = 1'16$ :—

Pitch Ratio.	Slip.	Efficiency.	r.p.m.	Brake h.p.
'6 ...	'310 ...	60 ...	1,450 ...	27'3
'8 ...	'375 ...	62 ...	1,200 ...	26'4
1'0 ...	— ...	— ...	— ...	—
1'2 ...	— ...	— ...	— ...	—

Three-bladed propeller  $\kappa = '87$ :—

'6 ...	'240 ...	63 ...	1,315 ...	26'0
'8 ...	'325 ...	65 ...	1,110 ...	25'2
1'0 ...	'366 ...	65 ...	947 ...	25'2
1'2 ...	— ...	— ...	— ...	—

Four-bladed propeller  $\kappa = '75$ :—

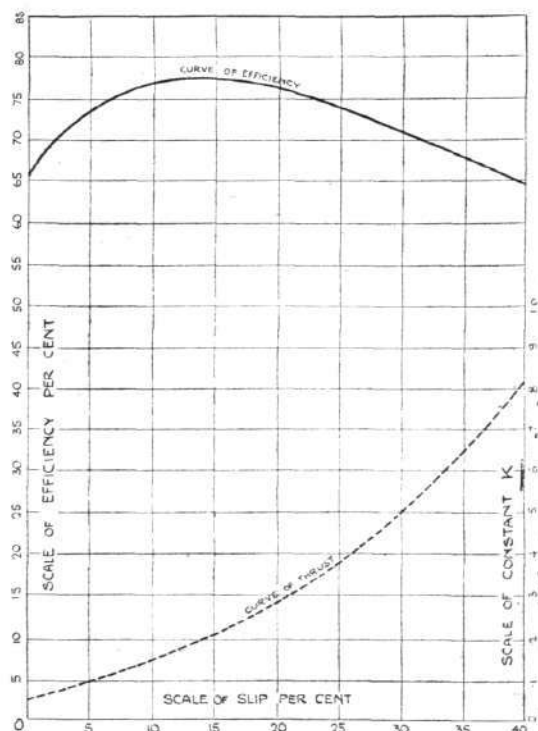
'6 ...	'200 ...	64'5 ...	1,250 ...	25'4
'8 ...	'290 ...	67'5 ...	1,060 ...	24'3
1'0 ...	'335 ...	67'0 ...	902 ...	24'4
1'2 ...	'380 ...	65'0 ...	806 ...	25'2

It will be seen that if we stick to the pitch ratios given there are nine propellers of 6 ft. diameter which will suit our purpose.

We should choose that one which is most efficient provided the revolutions are equal approximately to the revolutions of the engine. If not we must choose another propeller which is more suitable, or we can resort to gearing.

Here we come to a most important point, namely, the question of gearing down the revolutions.

The higher the speed of revolution of the shaft of the engine, the lighter the engine will be; this is an im-



No. (c).—Blade pitch ratio 1'2.

portant consideration. Also for really well-designed chains and spur-gearing, well lubricated, we may expect an efficiency of 95 per cent. for the gearing alone.

The advantages of gearing are obvious. We can accommodate any engine speed to the revolution of the propeller-shaft.

We can use higher speed engines and so save weight.

The best propeller, however, for the above case, if we were confined to 6 ft. diameter, would be the four-bladed pitch ratio '8 running direct off the engine-shaft at 1,060 revs. per min.

Now suppose we take the case of a propeller of 8 ft. diameter.



For two-bladed propeller  $\kappa = .65$  :—

Pitch Ratio.	Slip.	Efficiency.	r.p.m.	Brake h.p.	
				Without Gearing.	With Gearing.
.6 ...	.167 ...	65.5 ...	900 ...	25.0 ...	26.3 ...
.8 ...	.205 ...	68.5 ...	765 ...	23.9 ...	25.1 ...
1.0 ...	.307 ...	68.5 ...	650 ...	23.9 ...	25.1 ...
1.2 ...	.345 ...	68.0 ...	572 ...	24.1 ...	25.3 ...

Three-bladed propeller  $\kappa = .49$  :—

.6 ...	.100 ...	67.0 ...	834 ...	24.4 ...	25.6 ...
.8 ...	.200 ...	70.5 ...	703 ...	23.2 ...	24.4 ...
1.0 ...	.250 ...	71.75 ...	600 ...	22.8 ...	24.0 ...
1.2 ...	.300 ...	71.5 ...	535 ...	22.9 ...	24.1 ...

Four-bladed propeller  $\kappa = .42$  :—

.6 ...	.070 ...	67.5 ...	806 ...	24.2 ...	25.4 ...
.8 ...	.170 ...	71.0 ...	677 ...	23.0 ...	24.2 ...
1.0 ...	.220 ...	73.0 ...	577 ...	22.4 ...	23.6 ...
1.2 ...	.267 ...	73.0 ...	512 ...	22.4 ...	23.6 ...



# THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

## OFFICIAL NOTICES TO MEMBERS.

### Annual General Meeting.

The Annual General Meeting of the members of the Royal Aero Club of the United Kingdom will be held on Thursday, March 10th, 1910, at 5 o'clock, at 166, Piccadilly, London, W.

### Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the Committee are :—

Ernest C. Bucknall.	Earl of Hardwicke.
Vice-Admiral Sir Charles Campbell, K.C.M.G., C.B., D.S.O.	V. Ker-Seymer.
Col. J. E. Capper, C.B., R.E.	J. T. C. Moore-Brabazon.
Martin Dale.	Hon. C. S. Rolls.
	Roger W. Wallace, K.C.

The Earl of Hardwicke does not offer himself for re-election.

Any two members of the Club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretaries in writing not less than fourteen days before the annual general meeting. Wednesday, February 23rd, is the last day for the receipt of nominations.

The following members have so far been nominated :—

R. M. Balston.	Martin Dale.
Major Sir A. Bannerman, Bart., R.E.	P. Harrington Edwards.
Ernest C. Bucknall.	Philip Gardner.
F. Hedges Butler.	V. Ker-Seymer.
Vice-Admiral Sir Charles Campbell, K.C.M.G., C.B., D.S.O.	E. Manville.
Col. J. E. Capper, C.B., R.E.	J. T. C. Moore-Brabazon.
Major-General Cummins, C.B., D.S.O.	Hon. C. S. Rolls.
	A. Mortimer Singer.
	Hon. A. Stanley, M.P.
	R. W. Wallace, K.C.

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the annual general meeting.

No ballot paper which is signed, or on which the number of candidates voted for is more or less than the number of vacancies, or which is received by the Secretaries later than 12 noon on Wednesday, March 9th, 1910, will be valid.

### Committee Meeting.

A meeting of the Committee was held on Tuesday, the 15th inst., when there were present :—Mr. Roger W. Wallace, K.C., in the chair, Mr. Ernest C. Bucknall, Vice-Admiral Sir Charles Campbell, K.C.M.G., C.B., D.S.O., Mr. Martin Dale, Capt. A. H. W. Grubb, D.S.O., R.E., Professor A. K. Huntington, Mr. V. Ker-Seymer, Mr. J. T. C. Moore-Brabazon, Hon. C. S. Rolls, Mr. J. Lyons Sampson, Mr. Stanley Spooner, and joint secretaries, Capt. E. Claremont, R.N., and Harold E. Perrin.

Hence if it is possible to fit a propeller of 8 ft. diameter we should have twelve propellers at our disposal. In this case none of the revolutions come up to engine speed. Consequently we should be forced to gear down.

In this case therefore we have given the horse-power with and without gearing. It will be noticed that the best propellers are the four-bladed ones having pitch ratios of 1.0 and 1.2, each requiring 22.4-h.p. direct and 23.6-h.p. through gearing, the difference being that one has to be geared down to about 580 r.p.m., and the other to 510.

It will be seen also that a two-bladed propeller requires 25.3-h.p. It is a debatable point which of the two we should take, as the four-bladed propeller weighs twice as much and costs double the amount.

(To be concluded.)

### New Members.

The following new members were elected :—

E. Colmore.	Major James Austin Meldon.
Lieut. Charles Darbyshire.	Arthur Pritchard.
Clement J. Haydon.	Frank Rendle.

### Flights at Shellbeach.

The Hon. Maurice Egerton, on Saturday last, competed for the prizes offered by the Royal Aero Club at Shellbeach, and was successful in winning a £25 prize for a flight of 250 yards, and a £50 prize for a circular flight of 1 mile. The flights were observed by the Hon. C. S. Rolls, Capt. J. Spottiswoode, and Mr. Horace Short.

### Eastchurch Ground Committee.

A meeting of the Eastchurch Ground Committee was held at Eastchurch on Friday, the 11th inst., when there were present :—Professor A. K. Huntington, Mr. J. T. C. Moore-Brabazon, Hon. M. Egerton, Mr. H. Short, and H. E. Perrin. The Committee inspected the work in progress on the ground. The rules for the control of the flying ground were drawn up. It was decided to engage a day and night watchman.

### Aero Exhibition.

The Aero Exhibition will be held at Olympia from the 11th to the 19th March, 1910.

A special section will be set apart for models, and full particulars can be obtained from the Royal Aero Club.

### Eastchurch Flying Ground.

Commander Curtis and the Officers of the Royal Naval Depot at Sheerness have kindly intimated that the members of the Royal Aero Club may consider themselves honorary members of their mess.

### Gordon-Bennett Balloon Race.

Entries for the Gordon-Bennett Balloon Race close on the 22nd inst., and members wishing to compete are requested to notify the Secretaries on or before that date. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

The Race will take place in the United States.

### Gordon-Bennett Aviation Cup.

Entries for the Gordon-Bennett Aviation Cup close on the 22nd inst., and members wishing to compete are requested to notify the Secretaries on or before that date. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

The Race will take place in the United States.

The Hon. Maurice Egerton has sent in his entry.

E. CLAREMONT, CAPT. R.N.,  
HAROLD E. PERRIN,

166, Piccadilly.

Joint Secretaries.

## PROGRESS OF FLIGHT ABOUT THE COUNTRY.

(NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by 12 noon on Wednesday at latest.)

### Aviation Association of Ireland (HOTEL METROPOLE, DUBLIN).

A MEETING of the above Association was held in the Royal College of Science, St. Stephen's Green, Dublin, on the 8th inst. The President, Mr. J. B. Dunlop, was in the chair, and an extremely interesting lecture was given by the Vice-President, Dr. Lilly, M.A., D.Sc., on "Aviation." A large number of excellent lantern slides were exhibited on the screen, which were much appreciated by the audience. The lecturer first dealt with the why and the wherefore of flight, diagrams shown on the screen serving to elucidate very clearly his remarks. The lantern slides showed a large number of aeroplanes and dirigibles, the points of each being explained by the lecturer. He also dealt with the lines upon which the future development of aviation would probably be conducted. A cordial vote of thanks was then passed to the lecturer.

### Coventry Aeronautical Society (18 AND 19, HERTFORD STREET).

ON Wednesday evening, February 9th, a most successful lecture was delivered by Mr. A. P. Thurston, B.Sc., before the Coventry Aeronautical Society, the subjects being "The Normal and Inclined Plane," "Stream Line Surfaces," and "The Centre of Pressure and Resistances of Bodies."

Mr. P. V. Vernon, who occupied the chair, when introducing Mr. Thurston, pointed out the unique experience which Mr. Thurston had had, as for several years he had been Sir Hiram Maxim's right-hand man, and so was closely connected with the science and industry of aeronautics.

Mr. Thurston's lecture was of a mathematical character throughout, but, nevertheless, was delivered in an extremely interesting and understandable manner. The lecturer dealt with data which had been evolved by all the leading searchers in the new science, and it was remarkable to notice how closely the results of the various investigators approximated to one another when plotted in the form of curves.

After the lecture a most interesting discussion was entered into, although it would be more correct to say that the lecturer answered several questions which were put to him in a very interesting manner.

At the conclusion Mr. P. V. Vernon moved that a vote of thanks to Mr. Thurston be passed. This was proposed by Mr. W. G. Aston, and seconded by Mr. A. W. MacLeod. A vote of thanks was also passed to Mr. Gorton for the able manner in which he operated his lantern, which he was kind enough to lend.

### Kite-Flying Association (27, VICTORY ROAD, WIMBLEDON).

AT the Council meeting of the Association, held on Monday last, it was proposed that the title should be altered to "The Model Aeroplane and Kite-Flying Association of Great Britain," it being felt that, as many of the members have models, there was need for an organised system of competition. Besides this, it was thought that the Association would then be the better able to carry out the object for which it was formed—viz., supplying recruits to the Aeronautical Society, Aero Club, and Motor Union. A general meeting is to be held at Caxton Hall, Westminster, on Monday, February 28th, at 8 p.m., to consider the matter, and if the motion is carried it will be a model club only, and not deal with the large, full-sized machines. If any member should wish to build full-sized machines, then he would join one of the societies formed for that purpose, as this Association will only work hand in hand with the three bodies named above.

This step has been proposed in order to sustain interest, and the Council are of opinion that there lie great possibilities for the development of aviation from such an Association, and will be pleased to welcome anyone interested in the question at the general meeting.

Tickets (free) can be obtained from the hon. secretary, W. H. Akehurst, at above address.

### Midland Aero Club (GRAND HOTEL, BIRMINGHAM).

ON the 25th inst. a meeting will be held in the Town Hall, Birmingham, when Major Baden-Powell will deliver a lecture on the national importance of aviation. Sir Alfred Hickman will preside, and the "Star" monoplane will be exhibited in the hall. Lectures have also been arranged for during the winter session by Mr. F. W. Lanchester, Sir Hiram Maxim, Mr. V. E. Johnson, Mr. Granville E. Bradshaw and Dr. Ratcliffe.

### Motor Union (Aviation Section). (CAXTON HOUSE, S.W.)

MAJOR J. N. C. KENNEDY gave a lecture on Tuesday evening, at the Royal Societies Club, on "Aviation from the Military Stand-

point," in which he considered how airships could be used during hostilities both ashore and afloat. By means of lantern slides he illustrated how aerial craft might be used in future engagements. There was just a possibility, he pointed out, that aviation might effect a desirable result from a humanitarian standpoint. With two opposing forces manœuvring in the field there could, in future, be no secrecy as to their disposition or strength—the commanders would know exactly to which side would fall the victory. In the circumstances, would the general who found himself at a disadvantage be justified in risking an action, or would the authorities at the War Office, who, of course, would also know the situation, allow the general to engage? When the conclusion was so apparent, would any useful object be attained by fighting the position? These considerations suggested that we were nearing the time when war would be no more.

### Northumberland Ae.C. (ROYAL TURK'S HEAD, NEW-ON-TYNE).

ON Wednesday evening, February 9th, in the club-room, a very interesting paper on "Flight in Theory and Experiment" was read by Mr. J. G. Nyborg, a member of the club, who has had great experience with gliders, and is the designer and constructor of the Nyborg monoplane.

Mr. Faraday Proctor presided over a large gathering of members.

The author, in the course of his paper, which was illustrated by numerous lantern slides and diagrams, gave a very lucid explanation of the problem that confronts designers and constructors of flying machines, and, with the aid of different formulae, showed how it was possible for all who desired to design their own machines to work out the area, horse-power, aspect ratio, span, and so forth, which will prove of the utmost benefit to many who were in difficulties over this matter.

A hearty vote of thanks to the lecturer, proposed by the chairman and seconded by Professor Henry Stroud, of Durham University, brought the proceedings to a close. The members then made an inspection of numerous aeroplane accessories and models made by members, including a 9 ft. by 7 ft. monoplane, constructed by Messrs. A. C. Hudson and S. Dorman; a beautifully-made miniature Blériot, by V. Temple, jun. (aged 13); a model biplane, by Pierre Auzéas, propelled in a similar manner to a bicycle; a model propeller moulding machine and monoplane with wooden planes, designed by A. Allan; and sections of wood channelling, uprights and supports for gliders and aeroplanes, by the North-Eastern Patterns Co. A 25-h.p. petrol aero engine, built by the Advance Motor Co., Northampton, to the order of Mr. Oswald Elsworth (N.Ae.C.), for his full-size monoplane, now nearing completion, together with a locally built-up Blériot-type propeller, came in for a great amount of attention. The committee hope to arrange a series of papers on different subjects, to be read by members during the next few months.

### Oldham Aero Club (5, CHURCH TERRACE, OLDHAM).

AT the weekly meeting on Thursday, the 10th inst., the chief item in the programme was a paper by Mr. A. Pegler, of Oldham.

Upon rising to speak, Mr. Pegler said his subject for the evening was "Choice of Types of Internal-Combustion Engines for Aeroplanes."

Mr. Pegler introduced many new and novel appliances, with models and drawings, including the producer and oil-gas plant arrangements. The lecture was largely devoted to technical data, although there was a good deal of theory, together with present-day facts.

Mr. H. Worthington brought a biplane of fish-shaped section, which flew 50 yards.

### Rugby Engineering Society.

THE Rugby Engineering Society held their second conversazione at the Town Hall, Rugby, on Friday last, the 11th inst., which was attended by upwards of 400 members and friends. This conversazione has become one of the functions of the winter season, and was carried out in such a manner and on such a scale as to make it compare favourably with similar functions organised by the leading technical societies in the Kingdom. The exhibits, of which there were a large number, were scientific in character and popular in form, and appealed equally both to members and their non-technical friends. Among so many exhibits which reached a high standard of interest and ingenuity it is perhaps impossible to select any for particular mention, but to give some idea of the field which the members of the Rugby Engineering Society covered by the

various exhibits and demonstrations given, we may mention that by the courtesy of the Humber Company a full-size Blériot monoplane was on exhibition. The design and development of aeroplanes in the form of models of completed planes of various designs and also of the various component parts showed the great interest which this development has aroused in the minds of engineers even when they are only able to devote to it their leisure time, as a large number of models were exhibited by various members of the Society of their own design and construction. In addition to the above, there were working models and demonstrations of gyrostats, a working model of the Brennan mono-rail car, a demonstration of the Optiphone, also a Foucault pendulum in operation, demonstrating the rotation of the earth, which aroused considerable interest. There were several short lectures, including one on aeroplanes by Messrs. J. P. Chittenden and L. R. Robinson.

#### Scottish Aeronautical Society (185, HOPE STREET, GLASGOW).

SATURDAY, March 5th, has been fixed upon as the date of the model competition, and although no definite venue has yet been decided upon, it is probable that the Agricultural Show ground at Scotstoun will be selected. There will be competitions for longest flight, circular flight, directional flight, and general efficiency, and the awards will consist of gold and bronze medals and money prizes. One hundred points will be given to the model making the longest flight, and one point less to the other competitors for every yard which their machines fly short of the longest flight. In the circular contest, the model making the complete circle will receive 100 points, while a machine making only half a circle will get 50 marks, and others in like proportion. In the directional flight the machines will be required to fly between two upright posts.

#### Women's Aerial League (227, STRAND, W.C.).

COLONEL CAPPER, C.B., gave a lecture on "The Command of the Air" to a crowded meeting of the Women's Aerial League and their guests at the Caxton Hall on Tuesday afternoon, the 15th inst., when Rear-Admiral the Hon. Sir E. Fremantle was in the Chair. Colonel Capper dealt principally with airships, and gave a most interesting account of the principal types in Germany, France and Great Britain. Towards the end of his lecture he gave a series of pictures of aeroplanes, with a brief history of each one. The slides were excellent, and the lecture was listened to with marked interest. Colonel Capper earnestly appealed to all those present to join the Women's Aerial League, and assist in arousing Great Britain to take steps to catch up other nations before it was too late. In proposing a vote of thanks to Colonel Capper,

Mrs. Watt Smyth, the founder of the Women's Aerial League, said that their great wish was to be treated as a serious and earnest body of women working to establish aviation as a science and an industry in this country. The fact that Colonel Capper had himself offered to give this interesting lecture to the Women's Aerial League was most encouraging to them, and they would work with fresh energy. Mrs. Watt Smyth announced that the first scholarship of the League for research in aeronautics had been awarded to Mr. Bramwell, an associate of the City and Guilds of London Institute, and a Bachelor of Science, Honours 1st Class of the University of London, and a holder of numerous scholarships and medals. The research work will be conducted, through the courtesy of the director and the authorities of the National Physical Laboratory, at that Laboratory.

The next tea of the Women's Aerial League will be held in the Victoria Hall of the Criterion Restaurant on Thursday, March 3rd, at 3 o'clock. There will be a short address on aviation, and an excellent programme of music. Miss Dorothy Leviit has promised to give an account of her experiences.

Mr. Bliss Desbleds and Miss Bacon will lecture to the Boys' and Girls' Aerial League on dates which will be announced later.

All information and literature can be obtained from the Secretary.

#### Yorkshire Aero Club (63, ALBION STREET, LEEDS).

PROFESSOR GOODMAN presided at a lecture given at the Philosophical Hall, Leeds, on the 11th inst., by Mr. H. Crowther, curator of the Leeds Museum. The subject was "Air Currents," and Mr. Crowther went into it very fully, with great wealth of technical detail, his remarks being illustrated by a number of interesting experiments and an admirable collection of lantern slides. An air current, he said, was one of the most subtle things in nature. One could do nothing without causing some motion of the atmosphere, and yet no matter how pronounced that motion might be it never became visible. The subject was but very imperfectly understood, and the lack of light in this direction was a great barrier in the way of airship designers. Something might be done later on, proceeded the lecturer, in the way of experiments with coloured gases, and much might be learned from cloud study.

At a meeting held on the 8th inst., after some discussion, it was decided to affiliate with the Aero Club of the United Kingdom, as it is felt that this step will do much to enhance the status of the Yorkshire Aero Club.

It was also decided to postpone the model competition until the first week in March.

## FLYING IN EGYPT.

In our last issue we were able to record the doings at Heliopolis up to Tuesday, and it is from that point that we now take up the story. Wednesday—the fourth day of the meeting—showed an improvement as regards the amount of flying done, for eight of the competitors ventured aloft. The longest distance flown was the 85 kiloms. of Métrot (Voisin), and the next best was the 30 kiloms. of Balsan (Blériot), who was none the worse for his unfortunate smash on the previous day. Rougier went for 26 kiloms., Grade for 15 kiloms., and Latham for 10 kiloms., during which he rose to a height of 52 metres, sufficient to secure the daily prize for height. Besides these flyers, Duray (Farman), Riemsdyck (Curtiss), and Hauvette-Michelin (Antoinette) each flew for 5 kiloms., and Duray beat the 5 kilom. record, reducing the time to 4 mins. 12½ secs. The daily prize for speed was won by Balsan, who did the 10 kiloms. in 9 mins. 50½ secs. Thursday was practically a blank day, as the wind was against any prolonged flying, but Madame de la Roche and Le Blon both made qualifying flights for the Ae.C.F. pilot's licence, while Rougier won the daily height prize with an altitude of 48 metres. Gustly winds also prevented any long flights on Friday, when Rougier (48 kiloms.) was the best, Métrot being second with 36 kiloms., Balsan third with 35 kiloms., and Grade fourth with 14 kiloms. Le Blon captured the speed honours, his time for the 10 kiloms. being 8 mins. 7½ secs., while the 5 kilom. record was brought down to 4 mins. 2 secs. Rougier also improved on his height record by rising to 25½ metres, and he was the only competitor. Saturday was a blank day because of the variable wind, but Sunday, the concluding day, saw seven of the competitors, Rougier, Mme. de la Roche, Le Blon, Balsan, Riemsdyck, Latham and Grade all flying, but the only noteworthy performance was that of Balsan, who reduced the 5 kilom. record to 4 mins. 1 sec.

The final results were as follows:—

#### HELIOPOLIS PRIZE. (Height Prize.)

	metres		metres
1. Rougier (Voisin)...	255	4. Latham (Antoinette)...	52
2. Rougier (Voisin)...	219	5. Rougier (Voisin)...	48
3. Rougier (Voisin)...	193	6. Métrot (Voisin)...	40

#### Speed Prize (10 kiloms.).

	m. s.		m. s.
1. Le Blon (Blériot) ...	8 7½	4. Balsan (Blériot) ...	10 9
2. Rougier (Voisin) ...	9 30	5. Grade (Grade) ...	11 6
3. Balsan (Blériot) ...	9 50½	6. Rougier (Voisin) ...	11 24

#### (5 kiloms.).

	m. s.		m. s.
1. Balsan (Blériot) ...	4 1	4. Le Blon (Blériot) ...	4 47
2. Le Blon (Blériot) ...	4 2½	5. Sands (Antoinette) (not classed) ...	4 22
3. Duray (Farman) ...	4 12½		

#### EGYPT "GRAND PRIX" (Prize for Cumulative Distance).

	kil. m.		kil.
1. Rougier (Voisin) ...	153 500	7. Latham (Antoinette) ...	15
2. Le Blon (Blériot) ...	143	8. Mme. de La Roche (Voisin) ...	20
3. Balsan (Blériot) ...	139 500	8. Hauvette-Michelin (Antoinette) ...	5
4. Métrot (Voisin) ...	138 500	9. Duray (Farman) ...	5
5. Grade (Grade) ...	64	Not classed: Sands (Antoinette) ...	5
6. Riemsdyck (Curtiss) ...	29 500		

#### BARON EMPAIN PRIZE (Prize for Greatest Distance).

	kil. m.		kil.
1. Métrot (Voisin) ...	85 500	12. Mme. de La Roche (Voisin) ...	20
2. Rougier (Voisin) ...	65	13. Métrot (Voisin) ...	18
3. Le Blon (Blériot) ...	50	14. Grade (Grade) ...	15
4. Rougier (Voisin) ...	48	15. Grade (Grade) ...	14
5. Balsan (Blériot) ...	44	16. Latham (Antoinette) ...	10
6. Balsan (Blériot) ...	30	17. Latham (Antoinette) ...	5
7. Balsan (Blériot) ...	25	18. Duray (Farman) ...	5
8. Riemsdyck (Curtiss) ...	24	19. H. Michelin (Antoinette) ...	5
9. Rougier (Voisin) ...	30	20. Le Blon (Blériot) ...	5
10. Métrot (Voisin) ...	20	Not classed: Sands (Antoinette) ...	5
11. Le Blon (Blériot) ...	20		

Rougier heads the list of prize-winners, and secured 95,000 frs.; Métrot is second, taking 50,000 frs.; Le Blon third, 18,000 frs.; Latham fourth, 10,000 frs.; Balsan fifth, 9,500 frs.; Riemsdyck sixth, 2,500 frs.; Grade seventh, 2,000 frs.



# AVIATION NEWS OF THE WEEK.

## The Royal Aero Club of the United Kingdom.

As will be seen from the official notification on page 119, His Majesty King Edward has, at this early stage of the movement, recognised the good work done by the Aero Club of the United Kingdom, and has, as a mark of appreciation, granted the Club the right to use the prefix "Royal."

## King Edward and Olympia.

It is also extremely satisfactory to note that His Majesty the King has been likewise graciously pleased to accord his patronage to the Flight Exhibition which will open at Olympia on the 11th prox.

## Flying at Eastchurch and Shellbeach.

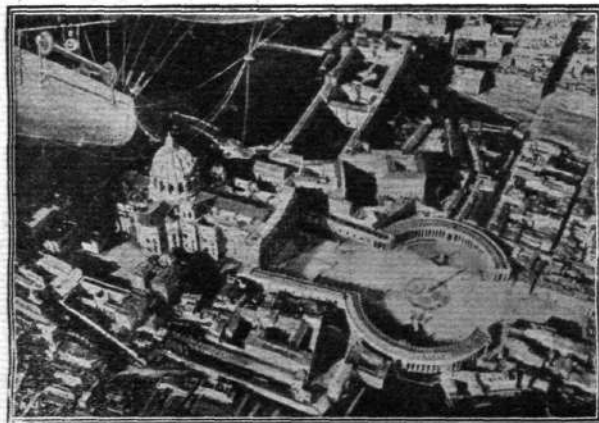
THE HON. MAURICE EGERTON is making good progress at Shellbeach with his British-built Wright machine, and has been awarded two of the Aero Club prizes, one of £25 for a flight of 250 yards, and the other of £50 for a flight of one mile made on Saturday last, and witnessed by Capt. J. Spottiswoode and Mr. H. Short. His time for the mile was 2 mins. 30 secs. On Saturday he made his first long flight, covering over six miles.

As preliminary tuning up for his trials for the British Michelin Cup, Mr. Moore-Brabazon made four flights on Saturday at Eastchurch. In the morning he flew for four miles, while his longest trial in the afternoon was of ten miles. He also flew for eight minutes on Monday, carrying on his Green engined Short biplane 20 gallons of petrol, weighing about 140 lbs. Mr. Cecil Grace also made a flight of 300 yards on his Short-Wright machine, while Prof. Huntington has made some satisfactory trial runs with his machine, which has a Wolseley engine, although no attempt at free flight was made.

On Monday the Hon. C. S. Rolls flew for about 15 minutes on his Short-Wright machine, which has been fitted with a horizontal tail, at the Aero Club ground at Eastchurch, and the Saturday previous he indulged in a short spin on a French built Wright machine at Versailles.

## Sanders Biplane has a Mishap.

A MISHAP befell the biplane which has been built by the Brothers Sanders at Kessingland, near Lowestoft.



Remarkable view of St. Peter's, Rome, and the Vatican, taken from the Italian airship, "I bis." Note part of the dirigible car on the left which the camera has caught.

On Saturday, Mr. Kempton Sanders was trying the machine and had got it to rise to a height of about 20 ft. when it came into collision with some telegraph wires. This caused the machine to pitch forward and fall to the ground, smashing it, but fortunately Mr. Sanders was able to jump clear.

## Doings at Chalons.

DANIEL KINET, the Belgian flyer who is practising at Chalons on a Henry Farman machine, made a flight of 37 mins. over the country on Monday, while Van den Born was busy with his pupils. He gave lessons to fifteen of them, the cumulative distance travelled with them being about 125 kiloms. One of the most promising pupils is Geo. Chavez, who, at his fourth trial, flew for over 40 mins. on the 10th inst. He has since qualified for a pilote-aviateur's certificate.

## Sommer Weight-Lifting and Flying Across Country.

ON the 8th inst. Sommer was visited at Mazan by the Hon. C. S. Rolls and Baron de Caters, and although it was pouring with rain he determined not to let his visitors go away disappointed, so he brought out his machine and flew for five minutes. Continuing his experiments in weight-lifting, Sommer carried a load of 210 kilogs. during some trials on the 11th inst., and he has expressed his intention of gradually increasing the weight. On Monday last he flew across country to Brenilly and back again, attaining a speed of about 80 kiloms. an hour and being aloft for 17 mins.

## Wright Flyers at St. Moritz.

CAPT. ENGELHARDT and another German pupil of the Wright Bros. have been staying at St. Moritz for some days, and two Wright flyers have been despatched there by the German Wright Co., and it is announced that they will make experiments over the frozen lake towards the end of next week. Santos-Dumont has also been staying at St. Moritz.

## Flying at Issy.

THE flood waters having subsided, practice has once more commenced at Issy, and on Friday of last week Rigal made several flights on his new Voisin machine. M. Panwels brought out an entirely new Voisin machine for trial. He had, however, only just got clear of the ground when the machine was caught in an eddy and capsized, and sustained considerable damage. M. Blériot also brought out a new machine for trial, but in view of the state of the ground and treacherous wind made no attempt at free flight.

## Paulhan in America.

NEW ORLEANS was entertained by Paulhan on Monday last, when 30,000 people turned out to see him make a series of flights. In the first one he remained aloft for 18 minutes, while in a subsequent trip of only 9 minutes duration he rose to a height of 457 metres.

## Proposed Model Club for London.

READERS are reminded of the new Model Club which is being organised in London, and of which we spoke at length last week. The headquarters will be in the West End, and the Hon. Sec., *pro tem.*, is Mr. A. C. Horth, 2, West Grove Terrace, The Point, Blackheath.

## CORRESPONDENCE.

\* \* The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents asking questions relating to articles which they have read in FLIGHT, would much facilitate our work of reference by giving the number of the letter.

NOTE.—Owing to the great mass of valuable and interesting correspondence which we receive, immediate publication is impossible, but each letter will appear practically in sequence and at the earliest possible moment.

## PROPELLER PITCH.

[354] I am greatly obliged by your reply in issue of January 29th. The term "gaining pitch," for the meaning of which I inquired, occurs in the "Encyclopædia Britannica," Vol. 21, p. 825, as follows:—

"The causes of loss of work incidental to propellers of different kinds may be summed up as follows: Suddenness of change from velocity of feed to velocity of discharge. Propellers which suffer from this cause are the radial paddle-wheel and the common uniform pitch screw; while those which in varying degree avoid it are the gaining pitch screw, the feathering paddle-wheel, Ruthven's form of centrifugal pump, and the oar."

North Finchley.

F. C. HARROP.

[The term "gaining pitch" in the above context applies to the cambered blades employed in most modern propellers. Tangents drawn to the face of the blade at uniform intervals between the leading edge and the trailing edge represent a series of elemental portions of the blade progressively increasing in angle—i.e., gaining in pitch. By this means the air is received with less shock, and the cause of lost work mentioned above is more or less eliminated.—Ed.]

## MISS LILIAN E. BLAND'S BIPLANE "MAYFLY."

[355] I enclose two photos of my biplane, the "Mayfly." I made her entirely myself, with the exception of the metal clips, and, of course, the sockets, strainers, &c., were bought from English firms. I think she is the first biplane made in Ireland.

I had her out again to-day, wind of 18 m.p.h. My only difficulty is at present to prevent her flying when I do not want her to. To-day I had three men to assist me, two of them knew nothing about it, and she ran the rope through their hands and soared up 20 ft. before anyone was prepared. Fortunately the third man and myself had hold of a long rope, which saved the situation; in fact, we got the machine soaring beautifully for some time until a downward gust caught the elevators, which I had fastened, when she dived down and broke both skids, but did no other damage. It is quite a new sensation being charged by an aeroplane.

We then had quite a lively time sailing her down hill to the shed; a 4-ft. bank was cleared in fine style, and indeed the only drawback was the pace, for she wants to go about 30 m.p.h. I have now altered the steering arrangement so that the elevators can be controlled from the ground, which I naturally ought to have done from the first. I am also fitting two side panels, as I cannot very well work the balancing wings from the ground.

I have not yet had a chance of ascertaining the gliding angle exactly, but she soars with vertical ropes, and I imagine her angle is about 7 degrees. As I told you, she rises straight off the ground when faced to the wind. If we bring her gliding down in a steady wind she lands as softly as a feather. A few hours work has made the skids stronger than they were before; they both broke where the wood was cross-grained, but I have the greatest difficulty here to get good wood. The skids are American elm, which is very springy, and I must say they were severely tried.

LILIAN E. BLAND.

[Other aviators in embryo will not fail to have read with pleasure Miss Bland's breezy letter of her preliminary experiments, nor to wish her success in all future trials, particularly when she becomes the pilot of her machine.

[Soaring tests were carried out by the Brothers Wright with one of their gliders; the gliding angle is given by the slope of the hill if the glider soars on absolutely vertical ropes and the wind is blowing truly over the surface of the ground.—Ed.]

## SPRING MOTORS.

[356] With reference to inquiry No. 316 in your valuable Journal. I have been experimenting with clockwork motors for the past twelve months and have made the motor with interchangeable springs, 10-in. sharp-set propeller; motor complete, less spring, 6 oz.

With 8 oz. spring,  $\frac{1}{4}$  min., 305 revs. | With 12 oz. spring,  $\frac{1}{4}$  min., 336 revs.  
" 8 "  $\frac{1}{2}$  " 518 " | " 12 "  $\frac{1}{2}$  " 580 "

Will furnish photo and particulars if required.

Coventry.

W. J. JOHNSON.

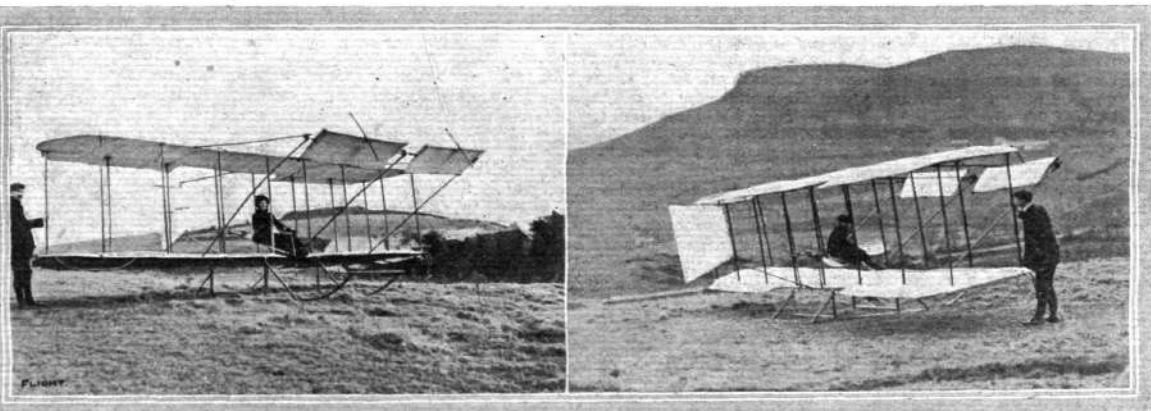
## PROPELLERS.

[357] The excellent articles that have appeared in your Journal recently on aerial propellers afford one a good opportunity of knowing how the different air machines are drawn through space.

The majority of propellers (so called) are practically fans, and have no part of a cemetical screw on their working surface. The reason why they draw the machine along is—the propeller revolving at such a high speed the blades buckle, and so get a certain percentage of grip and drag on the air. I think with a carefully-designed propeller we can do away with power, and have a smaller power engine, making a considerable economy in weight of engine, and also a saving in petrol consumption.

The design of an aerial propeller should be fairly easy, as you are not handicapped with the 'go astern' movement as in ship work.

The great thing one must try and get is a good centripetal force, then your propeller is doing good work practically to the outer diameter of the boss; that is obtained by having a deviating pitch and a lay back centre line. Another thing one must carefully study is the shape and design of the leading edge.



Miss Lilian E. Bland's biplane, "Mayfly," the owner up in the left-hand photograph. On the right S. Girvany, Ballymore, who has made the metal fittings and helped throughout its construction, is in the pilot's seat. The biplane has a span of 27 ft. 7 ins., area 260 sq. ft., weight with skids 200 lbs., aspect ratio 5.5, angle on skids 6 degs.

Aerial propellers must, of course, be especially designed to suit the class of machine they are going to drive. The blade area must be taken into consideration, and should be made and designed by experienced draughtsmen. A two-bladed propeller is and should be most efficient for aerial work. One cannot give too much attention to the design and make of the propeller, and when made it should be properly tested and set up, as the uneven wear and tear of the engine greatly depends on a properly constructed propeller.

I have had a varied experience with fast-running steam and petrol-driven propellers, and have produced some of the fastest propellers yet made, both corrugated and plain surfaces.

I have now turned my attention to the aerial propeller, and with the experiments I have made so far I think the majority of propellers now in use can be greatly improved upon.

Perhaps in a later issue, if the Editor permits and I can spare the time, I shall give some scale drawings of my experience.

Manor Park.

HENRY H. WILLIES.

## FRAMES FOR MODELS.

[358] Could any of your readers inform me of the lightest and strongest method of constructing a plane 2 ft. x 5 ins.

And also about what should be the weight of a model frame 1 ft. 6 ins. long, main plane 2 ft. x 5 ins. and tail 9 ins. x 3 ins., to lift at about 5 m.p.h. Wishing your most excellent paper every success.

Marlborough College.

THOMAS M. GARROD.

## HOLLOW SPARS.

[359] We notice in last week's issue of FLIGHT a letter (353) of T. W. K. Clarke, of Kingston, in which he mentions that his firm is the only one manufacturing hollow spars in England. As we ourselves have been manufacturing these for the past six months in stream line, oval and round sections, we could not let this remark pass unchallenged.

We shall be very pleased to submit samples of these to any readers of FLIGHT who may be interested.

While writing you we feel we must take the opportunity of informing you that FLIGHT has quite passed our expectations as an advertising medium, and quite bears out our own opinion that there is nothing like a specialist paper as a medium for reaching the public it caters for.

99, Snow Hill, Birmingham.

THE CENTRAL NOVELTY CO.

## AERONAUTICS FOR THE NAVY.

[360] In the article on "Aeronautics for the Navy," your correspondent, Mr. Griffith Brewer, writes of dirigibles, "They cannot reasonably be expected to go cruising with a fleet at sea, because the first gale encountered would mean their destruction." Surely this is wrong! How can a gale damage a dirigible when aloft? Can a strong tide or marine current of itself damage a steamer negotiating it? I have never heard of or experienced such a thing. Disregard the possible effects of wind upon the steamer navigating a tide or current and you have the same conditions as will obtain with a dirigible in a gale—with the exception that the velocity of the aerial current will be much greater than that of the marine current. The airship moves through and with the wind, and unless it be made fast to some stationary or comparatively stationary object (such as a steamer), the wind cannot exert any pressure upon the dirigible other than that normally caused by the vessel's progress through the air. And apparently the danger would not be very great even if the dirigible were made fast to a vessel, since Mr. Brewer advocates the use of captive balloons at sea, when the wind is too high for aeroplanes. Surely the dirigible, whose container is designed to afford as little resistance to the air as possible, would stand, under the same circumstances, as much as the spherical balloon. The dirigible could use its engine to relieve the strain on the tow-rope, and its planes to maintain equilibrium. The only effect on a dirigible, not being towed, will be if the speed of the wind is greater than that of the vessel to drive it to leeward, and this effect will be decreased as the speed of the dirigible is increased. There appears to be no reason why a dirigible should not keep the air at sea for an indefinite period. Ballast, in form of water, is easily procurable, if air ballast is not used. Fuel could be renewed from a vessel beneath in all weathers suitable for handling aeroplanes or captive balloons, and there appears to be no reason why the gas supply should not be replenished under the same conditions. A dirigible scout will be far more reliable, far more efficient, and far easier to maintain aloft at sea than an aeroplane scout. The aeroplane depends upon its engine to keep it aloft, and so far this has been its weak point, and will be where

over-sea work is concerned for some time to come, for, granted that it can be fitted with floats, how long will it last if it has to descend in a choppy sea? With regard to the captive balloon for naval use, I would point out that the Italian Navy has a balloon ship, the "Elba," and the French naval depot ship "Foudre" also carries a balloon. It would appear probable that our Admiralty has watched the work of these vessels, and found that the result would not justify their adoption. The dirigible possesses all the advantages of the captive balloon for naval scouting work, and many more. It can rise to the same altitude, but it can also cruise ahead of the fleet, and so see far more in advance of a balloon which is fast to one of the ships. If a captive aerial scout is required, the man-lifting kite would be better than a captive balloon; it needs no inflating, it can be got ready and got aboard easier and quicker, and it would offer considerably less resistance than a balloon if the vessel towing it had to take to her heels on the advent of the enemy. What would be the resistance set up by a 15,000 c. f. balloon towed against a 30-mile breeze by a scout with hostile cruisers at her heels, and what would the crew of the scout say about the balloon? And what kind of job would it be to get that balloon on deck under the same circumstances? I have formed one of a crew of 36 men who spent five hours aloft on a 3,000 ton windjammer, trying to make an upper topsail fast, and then lost it. That was a tough enough job, but I should imagine it would be a picnic compared to getting the balloon tied up!

Pin Mill.

HAROLD R. INGERSOLL.

[361] The article dealing with the above subject in your issue of February 5th should prove most interesting to members of the Senior Service, but I beg to take exception to several of the suggestions made therein.

Surely the difficulties of launching an aeroplane from a warship, and subsequently landing same on this vessel at sea, although perhaps not insuperable, would require such extra apparatus and fittings as to seriously curtail the fighting efficiency of the ship.

A light upper deck, as suggested by your contributor, for launching the aeroplane, must necessarily add to the resistance of the ship, enemy's target area, and fire and splinter risk, if permanent; and if only to be rigged temporarily must take up a certain amount of stowage space, a factor now jealously restricted in modern warship construction.

Neglecting for the time being the dangers and risks of starting the aeroplane, which I agree would be considerable, the alighting or return to the deck after a flight would appear to be practically impossible by reason of the uncertainty of the aviator to so regulate the speed of his aeroplane with that of the ship, considering the exceedingly small free open space for such a descent thereon, as, unless the area of the raised deck suggested be so excessive as to prohibit its use, this landing would be impossible, and leave the quarter-deck as the only alternative haven—a space too restricted and taken up by bollards, skylights, guns, barbettes, &c., to be feasible.

It would, of course, be possible to construct specially-designed vessels for the launching and return of aeroplanes for use in the Navy, but it is hardly likely that the Admiralty will incur this expense until these machines have been more fully perfected.

As a naval officer, and one seeking employment in the Naval School of Aeronautics, I quite agree that every effort should be made, and encouragement given to naval officers, to thoroughly test the possibilities of the aeroplane; but until its manoeuvring qualities can be more easily controlled, it would appear, as suggested by your contributor, that the captive balloon of the smallest practical capacity is the most reliable and compact aerial scout for the Navy.

A. SYDNEY GUSH,  
Engineer Lieutenant, Royal Navy.

[362] The article in your issue of February 5th by Mr. Griffith Brewer puts forward many interesting points, particularly with regard to the starting of a flying machine from the deck of a warship, and to the landing thereon after the completion of flight. This subject has received my attention for a long time, and not only that, but I have made, some time ago, practical propositions to the Admiralty with regard to the design of a special flying machine for naval warfare. I must, however, join issue with the writer of your article with regard to the type of machine which would be in all probability the most suitable for the purpose.

He states emphatically that such a machine must be "capable of executing with the greatest ease and accuracy the sharpest movements and curves. It must also be a machine with the greatest strength in proportion to its weight, and consequently must be a biplane."

It must be obvious to those who have seen these machines in flight that a biplane, for several reasons, is not the type of machine



which could be most effectively used, and with the least risk in naval warfare, and without holding any brief for one particular type of machine or another, I must say that reasoning with an open mind, the small specially-constructed monoplane capable of flying at very high speeds is the only practical proposition for the purpose. I have carefully considered many of the details which Mr. Griffith Brewer points out in his article, and fail to see how any of the points militate against the use of such a type of machine as I have suggested to the Admiralty.

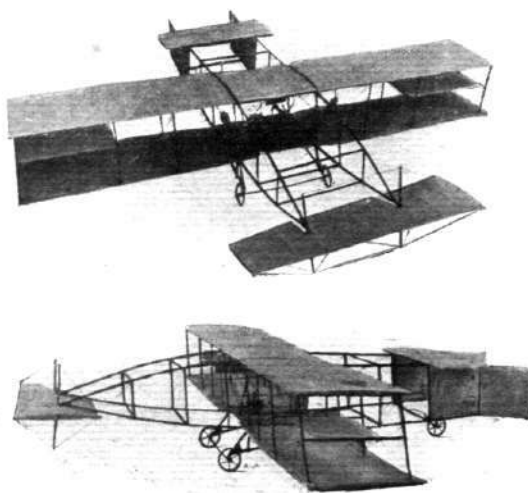
I have already offered to build them a machine for demonstration if they will meet me in the matter of cost, but up to the present they have not seen their way to do this. I can only hope that they will be as enterprising as certain other foreign Governments in this respect, as there is not the least doubt that the use of a high-speed monoplane in the hands of a highly-skilled aviator would be of inconceivable advantage in the next naval war.

R. W. A. BREWER.

### PROGRESS IN SCOTLAND.

[363] Herewith I send you two photos of biplane of our own model and construction.

This is our third made and sold. We are now making a fourth, 29 ft. span; and a fifth is ordered, which must be ready for the



Mr. J. Gibson's biplane.

London Show. It is intended by the purchaser to show also at Berlin.

I thought you would like to know what we up North are doing for aviation.

Caledonian Motor and Cycle  
Works and Garage, Leith.

JOHN GIBSON.

### DELAGRANGE ACCIDENT.

[364] It has been said by many authorities that the cause of Leon Delagrangé's fatal accident lay in the lack of mechanical skill of that unfortunate aviator himself. It seems to me, however, that such a grave accusation is worthy of the most diligent investigations.

Having had the privilege of the late M. Delagrangé's acquaintance, I feel sure that he would have been the last to do anything foolhardy for the sake of mere show; and although he had no great experience of mechanics as such, the fact that he had successfully been piloting Voisin, Wright and Blériot machines, gave him so much practical knowledge that Le Blon, an old racing motorist, was astonished by it.

Delagrangé's accident must have been caused either by the overwarping of the wings, which would have caused a loss of equilibrium, or by the breakage of one of the main spars of the chassis, or again by the snapping of a trussing-wire.

The first supposition is hardly probable when we have to do with such an experienced pilot.

As to the second, it has been affirmed that Delagrangé did away with the cross-pieces which kept the egg-shaped nacelle from doubling up into the shape of an elongated "8"; presumably without replacing this arrangement. But according to Le Blon, he and his

master suitably strengthened the sides of the chassis on purpose to ward off the chance of such an accident, which did not happen at Doncaster, when the speed record was broken.

Now, with reference to the third hypothesis, Delagrangé himself stated that he was perpetually anxious when (whilst flying at high speeds) he heard the supporting wires hum and quiver in the wind, and that he intended to have them replaced shortly by metal bars or tubes of great lightness.

Thus, from the very opinion of the dead aviator himself, it seems almost certain that the smash was caused by the snapping of a wire, an occurrence which, according to the written opinion of H. Farman, "inevitably causes the destruction of a monoplane."

If this is so, the accident is not due to the defect of that particular monoplane, but to an inherent defect in all monoplanes whose wings are supported by wires, and I think the question that it raises of the relative merits of wire and light steel bars, or again such a system as is employed on the R.E.P., is one deserving of particular attention from designers.

H. R. D'ERLANGER.

### WHALEBONE STRIPS WANTED.

[365] I have read with interest the description of the construction of model "planes" given by your correspondent, the Rev. Harold Kelk, in your issue of December 25th, 1909, No. 52, page 837. Could you tell me where I could obtain the whalebone strips he speaks of?

Canterbury.

E. A. LATTER.

### MODEL MONOPLANE LIFT.

[366] Replying to Mr. G. Mackay (344). As the flying speed is not mentioned, I have worked the lift out at 10, 15 and 20 miles an hour:—

10 miles between 9-1375 lb. or 14-6 ozs.

15 " " 1'98-84 " " 30-13 "

20 " " 3'5-2'4 " " 56-38 "

As to the propeller, Mr. Mackay does not give size of rubber to be employed, or number of revolutions per minute. As far as I can tell he would need from 8-10 strands of  $\frac{1}{8}$ -in. sq. rubber, or about 6 strands of  $\frac{1}{4}$ -in. strip. Hoping this will help.

W. Didsbury.

HAROLD VON SCHRÖDER.

### SIZE OF WOOD FOR BLÉRIOT MODEL.

[367] I should very much like to ask, through the columns of your valuable paper *FLIGHT*, of which I am a regular reader, what would be the best size of wood to use to build a model Blériot, eighth of the full size of No. 11, and also the best propeller and motive power to drive it, so that it would fly between 500 to 600 yards.

Sheffield.

C. F. W. CUDWORTH.

### COVERING MATERIAL.

[368] Very many thanks for publishing my inquiry in *FLIGHT*, January 15th, and for the answer.

Perhaps, if you would be so good, you could inform me what the material was that Mr. Humphrys used on his tractor screw to cover up the wood. As far as I could see at Blackpool, it was a fine proofed silk, and struck me as a most sensible idea for preserving and strengthening so important an item. Wishing your paper every success.

GERALD J. NEWENHAM DEANE.

[We do not happen to know the exact material employed, but perhaps Mr. Humphrys will oblige our correspondent with the information.—Ed.]

### SOME OTHER ANSWERS AND QUERIES.

#### Answers.

Model Drawings and Materials (334).—T. H. Wintringham, of Grimsby, suggests Hill and Co., 21, Bolton Road, Bury, for drawings and materials.

J. Morris, of Pontypool, recommends A. Melcombe, of Castle Road, Bedford.

"A.B." suggests the Melton Aeroplane Co., Melton Mowbray.

We think a study of *FLIGHT* advertisement columns would also give considerable assistance.

Working Drawings of Cheap Gliders (293).—Messrs. Norman and McKnight, of 145, Argyle Street, Glasgow, write that they are able to supply detailed drawings for building a glider.

To Bend Bamboo (263).—W. F. Fletcher, of Ilkeston, states he finds dry heat the best for bending bamboo to a permanent curve, that from a gas ring being enough.

#### Queries.

Elastic Motor and Landing Chassis.—R. A. Cooksey, of Hildenborough, asks for particulars of a geared elastic motor suitable for a scale model Antoinette monoplane, scale 1 in. to 1 ft. Also particulars as to landing chassis for same model.

## AIRSHIP AND BALLOON NEWS.

### Mishap with "Gross III."

ON Wednesday afternoon of last week the latest of the German military dirigibles met with a mishap, as a result of which it will be out of commission for some time. The airship had been cruising over Berlin for some hours when it was noticed that the envelope had collapsed towards the rear end, thus rendering the craft unmanageable. For some time it was able to make a little progress against the wind, but eventually this became impossible, and the vessel drifted at the mercy of the wind. An attempt was made to land at the Templehof field, but this was not effected, and the dirigible drifted on a couple of miles further, where it came down in an open field. Apparently, the mishap was due to the bursting of a ballonette, and the damage to the framework caused by the sudden landing was so serious that Major Gross ordered the machine to be dismantled and taken back to Tegel by road.

### Trial of Clouth Dirigible.

ON Monday afternoon the Clouth dirigible was given a trial lasting three hours, during which it manoeuvred above Cologne. Several modifications have been introduced since it last appeared, and in its trial on Monday the effect of driving the airship by only one screw was tried, and found to work well. The dirigible at present finds shelter in the military aero dock at Bickendorf, and although permission to use this expired last Tuesday, it has now been extended for a fortnight.

### "Espana" in the Air Again.

THE Astra dirigible "Espana," built for the Spanish military authorities, has now been repaired and reinflated at Pau, and on the 11th was given a trial trip, which gave satisfactory results. M. Deutsche de la Meurthe and M. Kapferer were in charge, while the other passengers were Airaud, the pilot, and Col. Vivez and Capt. Kindelan, the two Spanish military officers who will take over the vessel when she has passed her tests. The dirigible manoeuvred for some time above Pau at a height of 150 metres.

### Across the Irish Sea.

AFTER a very long interval the Irish Channel has again been crossed in a balloon, Mr. John Dunville accomplishing the feat in his balloon, "St. Louis" on Tuesday last, accompanied by Mr. C. W. Pollock. They started from Dublin at 10 a.m., and were sighted at the South Stack signal station at 12.30. Passing over Holyhead, they were carried by the wind towards Chester, and eventually landed safely at Birtles, near Macclesfield, at 3 p.m. The maximum altitude attained was 10,000 ft., where the thermometer showed 27 degrees of frost. The average speed worked out at 34 m.p.h.

### Index and Title-Page for Vol. I.

THE Index and Title-Page for Vol. I, January to December, 1909, of FLIGHT, has now been published. Any reader may obtain one by sending 2d. to the publishers, 44, St. Martin's Lane, London, W.C. After February 28th, a charge of 6d. post free will be made.

### PUBLICATION RECEIVED.

*Airships in Peace and War.* By R. P. Hearne; with an Introduction by Sir Hiram S. Maxim. London: John Lane. Price 7s. 6d. net.

## DIARY OF FORTHCOMING EVENTS.

### British Events.

1910.	Flight Exhibition at Olympia	1910.	Flight Meeting, place not fixed.
Mar. 11-19		Aug. 6-13	
July 11-17	Bournemouth Flight Meeting.		

### Foreign Events.

1910.		1910.	
April 9-10	Biarritz.	July 14-24	Rheims to Brussels, cross country event.
April 10-11	Cannes.	July 24-Aug. 10	Belgium.
April 10-25	Nice.	Aug. 25-Sept. 4	Deauville.
May 10-16	Berlin.	Sept. 8-18	Bordeaux.
May 14-22	Lyons.	Sept. 24-Oct. 3	Milan.
May 20-30	Verona.	Oct. 18-25	America, Gordon-Bennett Balloon Race.
June 5-12	Vichy.	Oct. 25-Nov. 9	America, Gordon-Bennett Aeroplane Race.
June 5-15	Budapest.		
June 18-24	St. Petersburg.		
June 26-July 10	Rheims.		

### Aeronautical Patents Published.

Applied for in 1909.

Published February 17th, 1910.

2,443.	J. GAUNT.	Aerial propellers.
9,805.	J. GALEA.	Automatic balancing apparatus for aerial machines.
18,204.	M. HARTZ.	Apparatus for aerial navigation.
23,270.	H. MESINGER.	Airships.

## BACK NUMBERS OF "FLIGHT."

SEVERAL back numbers are now very scarce, and have been raised in price as follows:—

No.	2, Jan.	9, containing	Table of Propellers ...	Price.
				s. d.
3	" 16	"	" Engines ...	1 6
4	" 23	"	Engines at Paris Salon ...	3 0
6, Feb.	6	"	" "How Men Fly" ...	3 6
			Aeronautical Bibliography.	1 0
8	" 20	"	Wright Bros. Elevator Patents.	
			Flying Ground at Farnbridge	1 0
10, Mar.	6	"	Illustrated Glossary.	
			Human Side of Flying ...	1 0
			Aero Club Ground at Shellbeach.	
			Military Aeronautics.	
12	" 20	"	Souvenir Supplement ...	1 6
15, Apr.	10	"	Engines at Olympia ...	1 0
16	" 17	"	Prize List ...	3 6
			Models at Olympia.	
31, July	31	"	Blériot Flyer ...	2 0
			(Full page drawing.)	

Other back numbers, post free, 1½d. each (including descriptions and scale drawings of the Voisin, Curtiss, Cody and Farman biplanes, the Santos Dumont, Antoinette, and Grade monoplanes, and of a full-size Wright glider.

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